APR 16 1957

BULLETIN OF THE GEORGIA ACADEMY OF SCIENCE

Volume XV April, 1957 Number 2

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PROGRAM NUMBER

THIRTY-FOURTH ANNUAL MEETING
OF
THE GEORGIA ACADEMY OF SCIENCE
GEORGIA STATE COLLEGE FOR WOMEN

Milledgeville, Georgia

May 3, 4, 1957

Local Arrangements Chairman – James Stokes
Georgia State College for Women

Georgia Junior Academy of Science Meeting and State Science Fair
University of Georgia, Athens – April 11-13, 1957

BRING THIS PROGRAM WITH YOU TO THE MEETING

W. B. Redmond Editor

A. S. Furcron
W. H. Jones
Florene M. Young
Assistant Editors

THE BULLETIN of the GEORGIA ACADEMY OF SCIENCE is published four times each year, in January, April, June and September and is sent without charge to all members of the Academy.

Articles to be published in the Bulletin should be sent to the Editor, Box 534, Emory University, Georgia. Reprints of articles can be furnished when ordered before publication.

PROGRAM

FRIDAY, MAY 3, 1957

Morning

8:00-12:00 Registration; Reservations for Annual Dinner. First Floor, Herty Science Hall.

9:00-11:30 Section Meetings, Presentation of Papers.

11:30-12:00 Section Business Meetings.

12:00- 1:00 Luncheon. (Where you find it).

Afternoon

1:15- 2:30 General Business Meeting of the Academy. Remarks by President. Peabody Auditorium.

2:30- 4:30 Section Meetings, Presentation of Papers.

Evening

6:30 Annual Dinner of Academy. College Dining Hall—$1.50 per Plate. Tickets at Registration Desk.

7:30 Presentation of Herty Medal. Address by Medalist. Russell Auditorium.

Following the address, members and friends are invited to the Old Executive Mansion, the Home of President and Mrs. Robert E. Lee for coffee.

SAURDAY, MAY 4, 1957

Morning

9:00-12:00 Section Meetings, Presentation of Papers.

SECTION I

BIOLOGY

FRIDAY, MAY 3, 1957, 9:00 A.M.

Herty Science Hall, Room 221

Thelma Howell, Presiding

Loss of Pine Growing Stock and Reduction in Diameter Growth from the 1954 Drought

E. V. BRENDER, Southeastern Forest Experiment Station, U. S. F. S.

In Middle Georgia, the average loss of merchantable-size pine trees from mortality was equivalent to one-half the normal growth of basal area, and the diameter growth of the surviving merchantable trees was reduced by one-half. Radial growth for the drought-year and the years immediately before and after shows a distinct influence of rainfall. The regression of the 1954 and 1955-growth on the 1953-growth of the same trees shows that rapid growing trees suffer slightly greater loss of radial increment than slow growers.

10 minutes 3 graphs

Studies in the Anatomy of the Family Celastraceae: Sub-Family Celastroideae

JOHN A. BOOLE, JR., Department of Biology, Georgia Teachers College

A detailed study of the wood of thirty-nine specimens representing nine genera in the subfamily Celastroideae of the family Celastraceae is made. Data obtained are combined with traditional morphological characters in an attempt to evaluate the natural position of the taxa studied. Evidence from this study supports the work of Loesener who included three tribes in the subfamily. This anatomical treatment shows tribe Euonymeae to be most primitive in regard to wood structure, tribe Euceastreae to be intermediate, and tribe Lophopetalum to be the most highly advanced group.

10 minutes 3¼ x 4 slides

Tree Growth in Relation to Climate and Soil Type

M. J. PLICE (Atlanta)

Two tree species, growing in Oklahoma in a certain type of soil—one having a high-leaf-ash content and the other a low-leaf-ash content—are compared to the same two species growing in Georgia in a different type of soil. The leaves of any particular tree species have, in general, a fairly typical ash pattern no matter where they grow. The ash constituents vary with varying soil moisture but are influenced only slightly by changes in geography or soil type. The annual increment of wood

formation in any tree is related directly to available soil moisture as is, also, the ash content of its leaves. But a high-leaf-ash tree does not necessarily have a greater annual increment of wood formation than a low-leaf-ash tree growing in the same soil.

10 minutes

Experiments on the Penetration and Reduction of TTC in Plant Tissues. I. Accumulation of TTC by Yeast Cells

BELA JAMBOR and MARTHA DEVAY, Institute Plant Physiology, L. Eotvos University, Budapest, Hungary, and LORIN W. ROBERTS, Agnes Scott College

Experiments were conducted with radicle segments of **Pisum sativum** L. (var. Express) and commercial baker's yeast. Determinations were made photometrically on intracellular reduced TTC and, by ascorbic acid reduction, total TTC (penetrated reduced and unreduced TTC). The difference between the photometric value obtained following ascorbic acid reduction and the value obtained from in vivo reduced formazan gave the value for penetrated and unreduced TTC. Yeast cells exhibited an active metabolic uptake of TTC with a corresponding high accumulation of the unreduced salt. Pea radicle cells exhibited a passive uptake of TTC with a constant unreduced fraction. The penetrated and unreduced fraction was unavailable for further reduction in a TTC-free medium. Differences were reported between pea radicle and yeast on penetration and reduction of TTC with various concentrations of succinic acid in the incubation medium.

10 minutes 2 x 2 slides

Experiments on the Penetration and Reduction of TTC in Plant Tissues. II. Sulfhydryl Content of Tissues and TTC Reduction

BELA JAMBOR and MARTHA DEVAY, Institute Plant Physiology, L. Eotvos University, Budapest, Hungary, and LORIN W. ROBERTS, Agnes Scott College

The total SH content of **Pisum sativum** L. (var. Express) radicle segments was determined by the amperometric titration method. Quantitative determinations of formazan production by the same tissues were made following incubation in a buffered TTC-succinate incubation medium. These results were compared with calculated values of formazan content from the total SH content. Experimental evidence indicated no quantitative relationship between total SH and reduction of TTC. Although earlier experiments indicated a histochemical correlation between the topographic localization of SH and formazan, this experiment indicates that SH groups are not involved directly, as a substrate, in the reduction of the indicator.

10 minutes 2 x 2 slides

Wildflowers of the Ida Cason Callaway Gardens

FRED C. CALLE, Ida Cason Callaway Gardens

10 minutes

11:30 A.M. – Section Business Meeting

Thelma Howell, Chairman, Presiding

FRIDAY, MAY 3, 1957, 2:30 P.M.

Herty Science Hall, Room 221

Symposium: Environmental Aspects of Nuclear Radiation

EUGENE P. ODUM, Presiding

Participants: Members of the Radiation Control Branch of the AEC Savannah River Plant.

This symposium will be of interest to all scientists but especially to biologists. Everyone agrees that environmental contamination may well be the limiting factor in the coming atomic age. During this program various environmental monitoring technics will be demonstrated, and the experimental work in radio-ecology being carried out at the Savannah River Plant will be discussed.

DEMONSTRATION PAPERS

4:30-5:30 P.M.

Herty Science Hall, Room 213

I. Pteridophyta in Four Georgia Counties

ELIZABETH L. SAWYER, and BILLY H. MASON, Piedmont College

Ferns previously unrecorded from four counties in Georgia include four from Habersham County: Botrychium alabamense Maxon, Cystopteris fragilis, Lygodium palmatum (Bernh), Sw., Polystichum acrostichoides f. incisum (Gray) Gilbert; six from White County: Asplenium trichomanes L., Botrychium alabamense Maxon, Botrychium dissectum Spreng., var. tenuifolium (Underw.) Farwell, Dryopteris intermedia (Muhl.) A. Gray, Lycopodium lucidulum Michx., Lycopodium complantum L. var. flabelliforme; one from Banks County: Polystichum acrostichoides f. incisum (Gray) Gilbert; and one from Tift County: Anchistea virginica (L.) Presl.

These workers are indebted to Mr. Lanier Chambers, Mr. Cyrus Darling and Mrs. John H. Pitts for calling their attention to stands of the last three specimens, respectively, and to Dr. Wilbur H. Duncan for a recent check-list of the ferns of Georgia and for assistance in identifying Lycopodium complantum L. var. flabelliforme.

Wild Flowers of the Pine Mountain Area

FRED C. GALLE, Ida Cason Callaway Gardens

This paper reports plants from the area, particularly those which have not been reported previously. The program now being developed at the Ida Cason Callaway Gardens whereby wild flowers from the entire State are being deposited at the Gardens for future study will be discussed.

10 minutes **2 x 2 slides**

Section II

CHEMISTRY

FRIDAY, MAY 3, 1957, 10:00 A.M.

Herty Science Hall, Room 317

UNDERGRADUATE STUDENT PROGRAM

Joint Meeting with the Georgia Section,
American Chemical Society

J. C. Simms, Presiding

Since students have been given a longer period to prepare their papers, the program for this meeting will not be available before April 15, but will be distributed at the meeting. These papers will be presented in competition for the F. Homer Bell Awards of the Georgia Section of the American Chemical Society.

11:30 A.M., Business Meeting of the Section

Chairman W. H. Eberhardt, Presiding

2:30 P.M. – Symposium on Physical Methods of Chemical Analysis

Gene Roberts, Presiding

1. **Coulometric Analysis: R. A. DAY, Department of Chemistry, Emory University. 30 minutes**
2. **Crystallographic Identification of Chemical Species: VERNON HURST, Georgia State Department of Geology. 30 minutes**
3. **Analysis Methods Based on Neutron Absorption: HENRY NEUMANN, School of Chemistry, Georgia Institute of Technology. 30 minutes**

Intermission

4. **Gas Chromatographic Analysis: HERSCHEL GODBEE, School of Chemical Engineering, Georgia Institute of Technology. 30 minutes**
5. **Thermogravimetric Analysis: ANDREW AUTREY, Department of Chemistry, University of Georgia. 30 minutes**

Section III

EARTH SCIENCES

FRIDAY, MAY 3, 1957, 10:00 A.M.

Herty Science Hall, Room 303

Willard H. Grant, Presiding

Comparison of Stream Sediments from a Quartzite-shale Area with Those from a Chert-Shale Area

THOMAS J. CRAWFORD, Geology Department, Emory University

Samples were taken from two similar streams. Stream A heads in, and flows through, a quartzite-shale area. Stream B heads in, and flows through, a chert-shale area.

Results show that the sediments of Stream A are better sorted than those from Stream B, and that the mean diameter of sediments of Stream B is greater than the mean diameter of sediments from Stream A.

Since the streams have similar volume and gradient these differences in sorting and grain size are probably a result of original grain size and weathering characteristics of the rocks.

10 minutes — Opaque projector

The Reworking of Former Shore Line Deposits by a Small Stream in West Florida

HOWARD N. CHAPPEL, Emory University

Lost Creek, in Leon and Wakulla Counties, Florida, heads on a Pleistocene sea terrace and cuts across at least two former shore lines and the intervening terraces. Sedimentary analyses of samples collected from both stream and terraces reveal some effects of reworking by the stream. Sorting and heavy mineral concentrations appear to be the elements most clearly affected. Of special interest are the heavy mineral concentrations which are being sought for economic reasons in Florida and parts of Georgia at the present itme.

15 minutes — Opaque projector

A Comparison of River Sands from the Tallapoosa and Conecuh Rivers of Alabama

LEWIS BRYAN HUTCHESON, Geology Department, Emory University

The Tallapoosa River, which drains a portion of Eastern Alabama, heads in and flows southward across crystalline rocks. The Conecuh River in Southeastern Alabama heads in and flows southwestward across Coastal Plain sediments.

Sands from both rivers were compared, to determine the degree of sorting and the heavy mineral percentage in each.

The data obtained shows the sands taken from the Conecuh River are better sorted, but contain lower percentages of heavy minerals than those taken from the Tallapoosa River.

10 minutes — Slides

Areal Appraisal of the Streamgaging Station Network in Georgia

M. T. THOMSON and J. W. RABON, U. S. Geological Survey, Atlanta

Sixty-two gaging stations are operated in and adjacent to Georgia to provide streamflow records indicative of the surface-water resources of minor streams. As a part of a nation-wide review of water resources investigations, statistical correlations have been made between the monthly flow data of 150 pairs of gaging stations in Georgia. Standard errors of estimate average about 30% throughout the range of flow in north Georgia and about 75% in south Georgia.

30 minutes — 3¼ x 4 slides

Flood Zoning and Flood Insurance

C. M. BUNCH, U. S. Geological Survey, Atlanta

The major provisions of the Federal Flood Insurance Act of 1956 are mentioned and the inter-relationship of flood zoning, flood control and flood insurance is discussed briefly. A reach of the Chattahoochee River through a section of Columbus, Georgia, is used to demonstrate the application of hydrologic data in the delineation of flooded areas and the evaluation of flood risk.

15 minutes 3¼ x 4 slides

SECTION III—BUSINESS MEETING

ELECTION OF OFFICERS

Section IV

Friday Afternoon

Herty Science Hall, Room 303

Willard H. Grant, Presiding

A Study of Water in Georgia

L. E. NEWCOMB, U. S. Geological Survey, Atlanta

Quantitative water-use data must be obtained from many different sources and will be found in many different forms. This paper describes the methods used by the author in compiling information on the rural, urban, industrial, irrigational, and hydroelectric-power use of water in Georgia, and relating water-use information to the State's water resources. Included is an explanation of the basis of estimates made of certain water uses for which data are lacking and the basis of estimates of future use.

15 minutes 3¼ x 4 slides

The Occurrence of Radioactive Minerals in Georgia

VERNON J. HURST, Department of Mines, Mining and Geology

At least 10 radioactive minerals have been identified from pegmatites: tantalite, allanite, euxenite, samarskite, urainite, soddyite, uranothane, beta-uranothane, metatorbernite, and metaautunite. The four minerals last named have been found also in geniss coating fractures. Two other minerals, unlike any previously reported, have been found.

Specimens will be displayed.

15 minutes

A Study of the Variation of Sand-Silt Sizes, Across Two Natural Levees on the Chattahoochee River

JAMES HANNON POUND, JR., Emory University

Surface samples were taken across two succeeding natural levees and into the flood plain on the north flank of the Chattahoochee River, two air miles west northwest from Holcomb Bridge in Fulton County, Georgia.

It was found that the sand particles composing the two natural levees were unusually well sorted with over 50% of each sample in the 1/8 mm. range. Between the two levees and on the flood plain proper the sand size particles abruptly decreased and the dominant particle size diminished to that of silt and clay.

15 minutes — Opaque projector

The Study of the Sorting and Heavy Mineral Content of a Piedmont Stream and its Saprolitic Bedrock

JOSEPH C. GOULD, Emory University

Stream and associated saprolite samples were collected from Peavine and Lullwater creeks in DeKalb County, Georgia. Stream sorting was found to be much better than saprolite particle sorting. The accumulation of heavy minerals in the alluvium is controlled by the size and shape of the grains.

15 minutes — Opaque projector

A Preliminary Study of Stream-Bottom Silt by the Use of the Pipette Method

WILLIAM L. SMITH, Emory University

Unconsolidated bottom samples were taken from South Fork Peachtree Creek and Peavine Creek in DeKalb County, Georgia. The silt from these samples was separated by the Pipette method and a comparison of the sorting and size distribution was made according to the Wentworth Scale. It was found that the majority of the silt is in the larger diameter classes and is well sorted. The period for dispersion in the N/100 sodium oxalate solution need not to be more than eight hours for this particular type of sediment.

15 minutes — Opaque projector

Angle of Repose Studies of Minerals

W. H. GRANT, Emory University

Angles of repose for mineral grains of various kinds, sizes, shapes, and densities were determined both in air and under water.

For common sedimentary minerals differences in density cause no significant change in the angle of repose. Rounded grains have angles from three to five degrees lower than more angular grains of the same size. The angle of repose for sand-size grains decreases with decreasing particle size. Upon crossing the sand-silt boundary the angle repose rises sharply. Subaqueous angles of repose range from one to five degrees lower than in the same material measured subaerially.

10 minutes — Projector

A Study of the Influence of an Ultrabasic Body on Stream Sedimentation

JAMES A. KING, Emory University

The sorting of a small stream in DeKalb County, Georgia, was studied to determine the effect of an ultramafic body on the stream sedimentation.

It was found that the addition of the ultrabasic material affects stream

sorting to varying degrees. In ultramafic terrain the sorting shows practically no tendency toward bimodal sorting. With increasing admixture of quartzo-feldspathic material poorer sorting develops. The end product exhibits bimodal sorting, a characteristic of sediments derived from two sources.

10minutes Projector

Synthetic Biaxial Quartz

W. H. GRANT and H. E. COFER, Emory University

Simple compression normal to the C-axis of quartz crystals results in the formation of biaxial quartz. The optic angle is observed to change from zero to approximately 10 degrees as the pressure is increased. The optic plane of the biaxial quartz is normal to the compression and includes crystal C.

The deformation is not permanent. The uniaxial figure reappears after the removal of stress.

10 minutes Projector

Section IV

PHYSICS, MATHEMATICS AND ENGINEERING SECTION

Friday, May 3, 1957, 11:00 A.M.

Herty Science Hall, Room 105

11:00 A.M. — Business Meeting

Bombardment Energy and Fission Product Yield Pattern

WILLIAM H. JONES, Department of Chemistry, Emory University

When uranium is fissioned by the impact of thermal neutrons, it was early observed that the split is seldom into equal halves. Later work showed that, as the projectile particle causing fission is increased in energy, bisecting or symmetrical fission becomes more frequent. The work here reported is part of an effort to study systematically this effect. In a series of cyclotron runs in the Oak Ridge National Laboratory, various isotopes of uranium and thorium were fissioned by the impact of protons having known energies between 11.0 and 22.0 Mev. At Emory radiochemical analyses determined the proportions of As-77, Y-91, Mo-99, Ru-103, Ag-111, Cd-115, Sn-125, Ba-140, Nd-147, and Sm-153 produced. These 10 isotopes gave 10 points from which a curve of yield vs. mass could be drawn, for that uranium or thorium isotope at that energy of bombarding protons. When these curves, representing relative yields, are normalized to a total yield of 100%, they may be used for obtaining approximate fission yields in per cent. As expected, the shape of these curves changes with the bombardment energy; a partially theoretical equation seems to correlate these factors.

20 minutes 3¼ x 4 slides

Adsorption of Gases on Porous Metal Plates

T. G. ROBERTS, Physic Department, University of Georgia

Measurements on the adsorption of oxygen, nitrogen and argon on porous copper and porous silver plates were made at temperatures of

-195°C, -78.5°C, and 0°C, over the pressure range from 0 to 760 mm. of mercury. The porous metal plates were made from alloys of copper-zinc and of silver-zinc by etching out the zinc. The adsorption measurements of oxygen and argon at -195°C show that condensation occurs in the capillaries of the porous metal plates when the pressure is an appreciable fraction of the vapor pressure. The effective surface area of the porous plates was calculated from the adsorption curves at -195°C. There was very little adsorption at -78.5°C, and at 0°C the adsorption was not measurable.

15 minutes 3¼ x 4 slides

Photographic Recording of Nuclear Coincidence Spectra

JACK W. CHIDSEY, JR., and R. H. ROHRER, Emory University

The output pulses from two scintillation detectors are fed to the x- and y- deflection plates of a coincidence gated cathode-ray tube giving a coincidence spectrogram.

Photographs of these patterns and their interpretations will be presented.

20 minutes 2 x 2 slides

A Sensitive D. C. Amplifier Employing Cadmium Sulfide Photocells

R. H. ROHRER, Emory University

A dependable high gain D. C. amplifier can be easily constructed using a sensitive galvanometer, two Cd S photocells, a stable D.C. power supply and the proper choice of resistors. An amplifier used to amplify the output of a differential thermo couple by factors ranging from 10 to 300 for driving a 10 millivolt chart recorder will be described. Voltage gains of more than 5,000 may easily be attained using this system.

15 minutes 3¼ x 4 slides

A Joint Radiology-Physics Program

R. H. ROHRER and D. R. McMILLAN, Emory University

A graduate level program of study and research is being developed in the field of Radiological physics at Emory University. The Department of Radiology in the Emory University School of Medicine and the Department of Physics of the College of Arts and Sciences have established a joint faculty position. A course in X-ray physics has been placed on the curriculum. Several graduate students have begun Master's Level research on problems of Radiological instrumentation and X-ray measurements. A description of the facilities of the joint program and the plans for its development will be presented.

20 minutes

A Study of Scattered Radiation from a Co^{60} Radioteletherapy Unit

J. N. JANSEN, Emory University

(Introduced by R. H. ROHRER)

The problems of shielding and of total body dose due to scattered Co^{60} gamma rays is being studied using a Scintillation Spectrometer. The instrumentation and some results of these studies will be described.

15 minutes

A Photoelectric Comparison of the Reflectivity of the Moon with that of Magnesium Carbonate Block

W. A. CALDER, Bradley Observatory, Agnes Scott College

Widely quoted figures for reflecting properties of the moon (.07 for albedo, and .12 for reflectivity) are based upon an analysis of data as of 1916, by Russell. Because of the bearing upon the visibility of artificial satellites, and also upon research proposals for project Vanguard, a redetermination of the average reflectivity of the moon has been in progress for the past three years at Bradley Observatory. Because of the severe conditions of atmospheric transparency required both day and night, present results are tentative, but indicate strongly that the moon may not be as black as has been assumed, perhaps by a factor of two.

Technique consists of comparing the surface brightness of a large portion of the moon with that of $MgCO_3$ block, using an intermediary comparison lamp, and reducing observations to a common altitude of sun and moon. The photometer was described in Am. Journ. Phys., Oct., 1956.

5 minutes 35 mm. slides

Section VI

HISTORY AND PHILOSOPHY OF SCIENCE

Friday, May 3, 1957, 9:00 A.M.

Herty Science Hall, Room 220

Richard Hocking, Presiding

Science and Values

JONATHAN J. WESTFALL, Botany Department, University of Georgia

We are in the midst of a new and unprecedented scientific revolution which has a profound bearing upon an accompanying world-wide social revolution. Man is gaining control over processes capable of altering the total environment and changing the basic heredity of man himself. It is imperative that newly attained powers be used for the maximum human good; and yet we are told that science does not deal with values; that science has no moral content. It is time to re-examine the limitations of purely subjective inquiry and the nature of scientific truth as defined by Galileo and Descartes, as truth detached from all considerations of purpose, value or practical application.

The term value, and related terms such as good, evil, right and wrong have meaning in relation to the presence in man of attitudes in favor or in disfavor.

Many groups in our society use every opportunity to express themselves in support of social or political action based upon their particular value judgments. Scientists as a group have been singularly silent or sporadic in their expressions on such matters, but they are at last becoming aware of the values of science as related to a responsible philosophy of science. Emphasis should be placed upon the fact that in any scientific endeavor there is a prior subjective choice of the purpose or value which the work is perceived as serving, and that the value of a particular endeavor lies outside of the endeavor itself.

Mythology and Romance Among the Elements

T. H. WHITEHEAD, Chemistry Department, University of Georgia

The scientist has been criticized by non-scientists as having no soul and being a cold-blooded realist. It has been said that he has no interest in the humanities.

One needs only to review the naming of the chemical elements to show how absurd this viewpoint is. The element cobalt was discovered in a deep mine where miners frequently suffered from pains in the joints. It was thought that little demons (kobalds) inhabited these mines and tried to drive intruders away by digging them with their little pick-axes. The story of Snow White and the Seven Dwarfs comes from this same myth. Only they were named dwarfs instead of kobalts or kobalds (goblins).

The student of Greek, Roman and other mythology should recognize some other names of elements immediately: Promethium (Prometheus); Titanium (Titans); Thorium (Thor); Tantalum (Tantalus). Many come from Scandinavian myths such as Vanadium (Vanadis). The astronomical myths are also numerous: Helium, Neptunium, Plutonium, Mercury, Tellurium, Cerium, etc., suggest their origin from helios, neptune, pluto, mercury, the earth, a planetoid, etc.

It is even possible that chemists are better acquainted with the humanities than the inhabitants of that ivory tower are with chemistry.

What is Many-Valued Logic?

LANE HARDY, Department of Mathematics, Emory University

The topics to be considered are:

1. A brief sketch of two-valued logic.
2. N-valued logic as a generalization of 2-valued logic.
3. Some possible applications to the study of other sciences.

Biological Research with Domestic Fowl

ROBERT S. WHEELER, University of Georgia

This paper is an historical sketch of some significant contributions to biology (from the fifth century B.C. to the present) in which domestic fowl were used as test objects in the original research. Contributions in the fields of nutrition, bacteriology, embryology, genetics, endocrinology, and virology are discussed.

Hens and growing chickens long have been used as subjects in practical research; research in which investigators apply already well-known principles of nutrition, endocrinology, and other sciences, and thus add to our knowledge and to our agricultural economy. This type of research with fowl is yet a relatively recent development.

The fowl is most famous for another type of research, a type in which the hen, baby chicks, or embryonating eggs were used, not to apply existing principles, but were used in the discovery and formulation of new concepts in the biological sciences.

The Criteria of Objectivity in History

JON J. JOHNSTON, Department of Philosophy, Georgia State College of Business Administration

This paper is devoted to an interpretation of the meaning of "Objectivity" as that term is peculiarly applied to historical explanation, and to showing that while historical explanation is of the same causal structure as ordinary explanation, it involves elements which are not reducible

to a purely causal analysis. Through an examination of actual critical judgments of historians on their fellows it is argued that an esthetic dimension is essential to a "good" historical explanation and to its cognitive value. An attempt is made, outside of an idealist interpretation of history, to estimate and analyze this cognitive value.

Section VI

Business Meeting -- Election of Officers

Section VII

SCIENCE EDUCATION

Saturday Morning, May 4, 1957, 9:00 A.M.

Herty Science Hall, Room 317

Virginia Parker, Chairman

Decatur's Crest Science Class

SUE S. ORMSTON, Decatur High School

Twenty-three senior students of Decatur High School who have been outstanding in science and mathematics are participating this year in a course designed to challenge the superior science student. Since this class does not require drill on fundamentals of mathematics and reading comprehension, much more can be accomplished in the study and application of the principles of physics. Experiments and application of nuclear reactions make up a part of the course. Time is also spent in discussing some of the more recent discoveries and theories of the nature of matter.

Although it is rather difficult to find suitable physics tests with reliable norms, several have been given and their results are quite interesting. Two more will be given before the end of the year and the results of tests, laboratory technique, etc., will be instrumental in deciding whether the course shall be continued.

15 minutes

The Ford Foundation Superior Student Program in Atlanta Public Schools

MRS. GORDON BROWN, Atlanta Board of Education

In February, the Atlanta Public School System entered an experimental program of advanced education for all students. The experiment was made possible by a grant from the Fund for the Advancement of Education (subsidiary of the Ford Foundation) and is known as the **Atlanta Experiment in Articulation and Enrichment in School and College.** Participating also in this program are the Westminster Schools and Agnes Scott College, Emory University and Oglethorpe University. The experiment at the present time is restricted to the program of studies at the eleventh and twelfth grades of high school and the first and second years of college.

Three Atlanta high schools are conducting classes in chemistry as

part of the program. At present we are giving attention to those who can assimilate most completely and rapidly the information and methods of science in these classes. The committee hopes that the chemistry offered not only will deal with fundamental concepts, laws, values, the atom, but also will expand its horizons to include present day applications of the theories in the many rapidly expanding fields of applied chemistry.

It is anticipated that the program will be expanded during the next school year to include other science classes at the advanced high school level such as Physics and Human Biology.

Savannah's Program for the Superior Student

WILLIAM A. EARLY, Superintendent, Savannah and Chatham County Schools

15 minutes (No abstract).

Future Scientists of America Program

KATHERINE HERTZKA, Director, FSA Region IV, Atlanta

The Future Scientists of America Foundation is a special agency of the National Science Teachers Association, established in 1952 by the NSTA Board of Directors, for the purpose of dealing with the problems of "locating, instructing and encouraging students with the potential of becoming productive in the scientific endeavor." Activities include publications dealing with science teacher recruitment and science career-counseling; a student publication, **Tomorrow's Scientists**; encouragement of summer jobs in industry and summer research assistantships for science teachers; research related to science teaching improvement; sponsorship of summer conferences. High on the list is the Science Achievement Awards program, supported by the American Society for Metals and operated by FSAF, which last year involved 20,000 students.

The foundation currently operates on a budget of over $75,000. Contributions from approximately 100 industries, individuals and foundations provide the funds. An administrative committee, composed of the president, treasurer and executive secretary of NSTA and seven appointed members supervise program planning and activities. An Advisory Board, Board of Consultants and Roster of Sponsors furnish help and advice. Business is transacted at an annual meeting of the Foundation in the fall and administrative committee meeting in the spring.

5 minutes

My Successful Science Project

Papers by Westinghouse or State Science Fair award winners.

20 minutes

The Georgia State Science Fair

ASHTON VARNADOE, Director, Georgia Junior Academy of Science

5 minutes

Possible Thesis Topics

FRED C. GALLE, Director of Horticulture, Ida Cason Calaway Gardens

Due to the interest shown last fall in the tour of Callaway Gardens by a group of Academy Members, the Gardens will allow use of its facilities to science seniors working on theses.

15 minutes

Here's How I Do It

A Demonstration of Leaf Pigments in Plants

HELENE NORWOOD LAMMERS, Murphy High School, Atlanta

The full role of all the plant pigments is still obscure, but the presence of chlorophyll "a," chlorophyll "b" and that of carotene and xanthophyll can be demonstrated by the use of the proper solvents. The carotenoids are found in all green leaves but are not seen until the chlorophylls are withdrawn and the fall coloration of the leaves appears.

Both the chlorophylls possess the property of fluorescence and both carry on carbon assimilation in the process better known as photosynthesis.

10 minutes

Action and Reaction

J. EDGAR MORRIS, Brown High School, Atlanta

10 minutes

The Professional Engineer, Scientist, Servant of Society

G. V. CARR, Georgia State Board of Registration for Professional Engineers and Land Surveyors

The term "professional engineer" is used to designate a person who is qualified by reason of his knowledge acquired by professional education and practical experience, to engage in the practice of engineering. The importance of the services rendered by engineers, and their responsibilities for the protection of the health, safety and welfare of the public, has made it necessary to enact laws regulating the professional practice of engineers and land surveyors.

15 minutes.

Indian Culture in the South

EUGENE CLINE, Bradley Museum, Columbus

There have been four major periods of occupations in this part of the country, Folsom, Archaic, Woodland, Mississippian. Of these cultures little is known of the Folsom, because from this period only the Folsom projectile point seems to remain. During the Archaic period a crude fiber tempered pottery developed along with burial mounds of shells and clay, although the chief possessions were large flint points and steatite ware for cooking. The Woodland culture reached no high development in the South, but during this time there were beads and other ornaments of copper and well developed pottery.

Many groups of Indians with a similar background made up the

Mississippians, who were not excelled in intellectual or material accomplishments anywhere in the United States. Among these people was a priestly cast which seems to have been foreign to the group as a whole, and whose origin is yet unknown, although it bears great similarity to some groups in Mexico. This great religious movement is known as the Southern Cult and was almost the same in all parts of the South as far west as Oklahoma, indicating that this priestly cast was well organized.

In recent years there has been a great deal of effort to learn more about these cultures of the past through scientific excavations and study of the materials which these yield. Just as important is the effort to make this knowledge available to the public through our museums.

The Use of our Indian Heritage in Grammar Grade Teaching

CLYDE KEELER, Georgia State College for Women, Milledgeville

Some of the author's Indian collection which will be of interest to teachers will be on display.

15 minutes

Remarks by Wilbur Duncan, President, Georgia Academy of Science.

BUSINESS SESSION